STRUCTURAL DESIGN CRITERIA NARRATIVE (2000 IBC)

The floor structure is designed for 25-psf superimposed dead load in addition to all structure dead loads. 15 psf of the load is an estimate for the access floor. The remaining 10 psf will cover mechanical, electrical, lights, and sprinklers.

The elevated floor structure is designed for 80-psf live load. This exceeds the minimum office live load of 70 psf (50-psf live + 20-psf partitions). Corridors above the first floor require 80-psf live load. Using 80 psf for the entire floor area allows complete flexibility for corridor location.

The roof structure is designed for 20-psf snow load in addition to all structure and roofing dead loads.

The wind loads are generated from 90 mph (3-second gust) wind speed and Class C exposure.

The seismic loads are generated from a mapped spectral response acceleration at short period (S_s) of .20g and a mapped spectral response acceleration at a 1-second period (S_1) of .10g. A site class definition B has been assumed and must be verified by the geotechnical report. This yields site coefficient factors F_a and F_v equal to 1.0. S_{Ds} and S_{D1} are .13 and .067 respectively with a seismic use group I, the seismic design category is B. The seismic base shear is about 4.4% g.

An allowable drilled pier bearing pressure of 50 ksf was assumed. This may change when the geotechnical report is completed.

Building skin loads are assumed to be light (15 psf or less). Any heavy elements such as precast fins shall be ground supported.

Concrete 28-day strength is 4 ksi.

Reinforcing steel yield strength is 60 ksi.

Structural steel yield strength is 50 ksi.

STRUCTURAL SYSTEM DESCRIPTION

The structural floor framing system is a concrete two-way flat slab with drop heads (option 1). The nominal slab thickness is 12" with 4" drop heads. The column spacing is approximately 25' on center in each direction. Concrete column size is approximately 22"x 22".

Other structural systems considered and priced were a concrete skip joist and girder system (option 2) and a composite concrete slab-on-metal deck with composite steel beams (option 3). Structural depths for options 2 and 3 are 21" and 23 ½" respectively.

The lateral load-resisting system for each option in the transverse direction is a rigid frame. Options 1 and 2 utilize the rigid concrete frame in the longitudinal direction as well. Option 3 will require bracing or shear walls in the longitudinal direction.

An expansion joint is anticipated on the edge of the atrium.

At this point in the design process, structural floor option 1 is preferred for the following reasons:

1. Structural depth for option 1 is shallower than other systems, requiring less building skin.
2. The soffit of option 1 is architecturally acceptable in appearance and does not require a ceiling. Options 2 and 3 require a ceiling.
3. Options 1 and 2 provide a 2-hour floor fire rating. Option 3 requires spray-applied fireproofing to obtain this rating.
4. The shallow depth of option 1 allows more light into the building at the perimeter.
5. Options 1 and 2 do not require bracing or shear walls in the longitudinal direction.

The structural roof framing system is a tongue and groove wood deck spanning to glue laminated timbers (option 1). Structural steel beams, joists, and metal deck (option 2) is also shown.

FOUNDATION SYSTEM DESCRIPTION

The geotechnical report has not been completed at this time. Rock is anticipated at shallow depths. The preliminary foundation design uses drilled piers on rock to support column loads. Grade beams between the piers will carry perimeter wall loads. Perimeter grade beams will extend at least 3'-0-deep to cut off frost and prevent heave. The preliminary foundation design will be revised when the geotechnical report is completed.